Effect of Salmosan, a β-galactomannan-rich product on intestinal barrier function

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Background and objectives:

The use of antibiotic growth promoters (AGP) in animal feed is prohibited in the European Union (regulation [EC] no. 1831/2003) due to the risk of developing resistance to antibiotics in human consumers. However, natural feed additives such as mannan oligosaccharides (MOS) are promising alternatives to AGP. MOS, natural substances obtained from cell walls of yeast and plants, have health-promoting effects as they have potential prebiotic properties. Salmosan® (S-βGM) is a hydrolyzed and highly β-galactomannan-rich MOS product developed from the carob bean of the *Ceratonia siliqua* tree and guar bean of *Cyamopsis tetragonoloba*.

Methodology:

We have studied the effect of S-βGM in chicken intestine and in an *in vitro* model of intestinal Caco-2 cells in culture.

Results and conclusions:

We have found that dietary supplementation with S-βGM in chickens infected with *Salmonella* Enteritidis increases mucus production and preve nts ZO-1 delocalization. These are effects associated with improved intestinal barrier function. Moreover, in Caco-2 cell cultures, we have confirmed the capacity of S-βGM to agglutinate *Salmonella* Enteritidis and to prevent epithelial barrier function disruption induced by the bacterium colonization. Furthermore, we have demonstrated that in combination with *Lactobacillus plantarum*, a recognized probiotic accepted to be used as an additive in animal nutrition (EFSA regulation [EC] no. 1831/2003), restores intestinal barrier function disrupted by TNF-α and LPS in co-cultures of Caco-2 cells and macrophages. This

protective effect could be related to the modulation of cytokine production and to the fact that S-βGM increases the growth of *Lactobacillus plantarum*.

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